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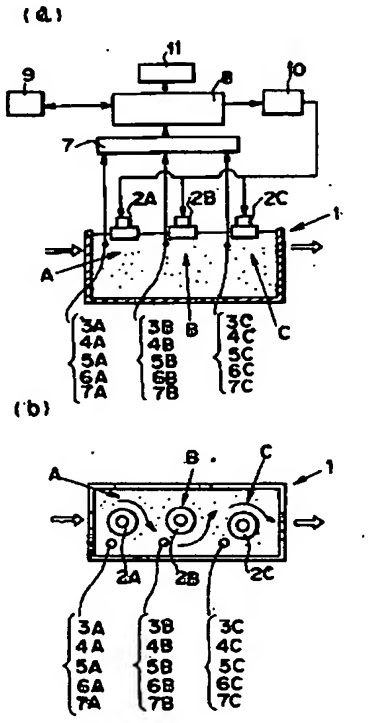
(54)【発明の名称】　安水の活性汚泥処理方法

(57)【要約】

【目的】　コークス炉から発生する安水の活性汚泥処理方法である。

【構成】　ばっき槽１のＡ、Ｂ、Ｃゾーンに各々撹拌機２Ａ、２Ｂ、２Ｃを設け、それらの撹拌機２Ａ、２Ｂ、２Ｃの近傍に温度センサー３Ａ、３Ｂ、３Ｃ、ＤＯ計４Ａ、４Ｂ、４Ｃと、その外、ＣＯＤ計５Ａ、５Ｂ、５Ｃ、ｐＨ計６Ａ、６Ｂ、６Ｃ、酸化還元電位（ＯＲＰ）計７Ａ、７Ｂ、７Ｃを設けている。ゾーン毎に測定された温度、ＤＯの値が、インタフェス８を介して、各々演算装置９に入力され、記憶装置１０からの必要なデータと比較演算されて、設定範囲を超える危険性を生じた場合は指令装置１１から警告して、撹拌機２Ａ、２Ｂ、２Ｃの回転数を制御して、正常状態に戻す。１２は表示装置である。

【効果】　一つのばっき槽のＡ、Ｂ、ＣゾーンのＤＯが設定範囲に制御されるので、安水中のＮＨ$_4^+$が分解することなく、円滑に活性汚泥処理が出来る。



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【特許請求の範囲】

【請求項１】　コークス炉から発生する安水をばっき槽を用いて活性汚泥処理する方法において、前記ばっき槽に複数の表面ばっき式撹拌機を流れ方向に順次配列し、それらの撹拌機によって形成されるゾーン毎に温度センサー、溶存酸素計を設け、それらのゾーンの処理液の温度、溶存酸素量を連続的に測定し、それらの処理液の温度に対応した溶存酸素量が１．５ｐｐｍを超えないようにするとともに、設定下限値以上になるように、ゾーン毎に独立的に撹拌機の回転数制御をして、活性汚泥処理することを特徴とする安水の活性汚泥処方法。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明はコークス炉から発生する安水の活性汚泥処理方法に関するものである。

【０００２】

【従来の技術】コークス炉から発生する安水には、各種成分及び不純物が含まれている。安水中の各種成分は所定の装置で分離回収され、またこれらを分離した安水は、不純物を含むために、活性汚泥処理、凝集沈澱処理した後、活性炭で処理して、放流している。

【０００３】上記活性汚泥処理は、バクテリアにより、生物化学的酸素要求量（ＢＯＤ）を除去するものであるが、安水中に、NH_4^+　CN^-　等のバクテリアに対する有害物質があり、これら有害物質の濃度により処理性が左右される。そのため、バクテリアの処理性をみて、処理性が悪いときは希釈等により有害物質の濃度を調整している。

【０００４】しかし、希釈の基準が明確でないため、活性汚泥処理が不安定になりやすい。その対策の一つとして、特開昭５８－６１８９２号公報には、安水をアルカリ処理して、全NH_4^+を５００ｐｐｍ以下とするとともに、上記処理してフリーアンモニア濃度を１５０ｐｐｍ以下とした後、活性汚泥で処理する安水の活性汚泥処理方法である。活性汚泥の処理として、ばっきを機械的に行う方法がある。ここでは微生物を繁殖させるための必要な酸素を供給させるために、撹拌装置が必要である。

【０００５】特開昭５９－１６２９９６号公報には、一般の生活排水等の有機排水を処理する方法として、非処理原水の流入側から流出側に向けて排出した機械式ばっき槽において、流入側の第２番目以降のいずれかのばっき槽の溶存酸素量（以降ＤＯと云う）を検出するとともに、その検出値と予めさだめた目標溶存酸素値とを比較し、その比較結果に基づいて、前記検出値が目標値と一致するように、前記検出したばっき槽と、それより流入側のばっき槽の各撹拌羽根の回転数を制御する方法である。

【０００６】

【発明が解決しようとする課題】しかしながら、安水の

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ようなNH_4^+等の有害物質を含んだ処理液では、ばっき槽での酸素の変動によって、NH_4^+の多少にかかわらず、それらが分解して、有害な影響を与える。そのため、安水のばっきを機械的に行う場合には、特開昭５９－１６２９９６号公報に示すような方法では、NH_4^+等の分解を生じる場合があり、そのような有害物質の分解を生じた場合には、逆にバクテリアが減少して、活性汚泥の円滑な処理を行うことが出来ない。

【０００７】この場合には、連続的に排水されてくる安水を円滑に処理することが出来ないので、工場の排水処理工程の操業に支障を来すという問題がある。そこで本発明では安水という特殊な処理液に適した活性汚泥処理方法を提供することを目的とする。

【０００８】

【課題を解決するための手段及び作用】上記目的を達成するために、本発明はコークス炉から発生する安水をばっき槽を用いて活性汚泥処理する方法において、前記ばっき槽に複数の表面ばっき式撹拌機（以降撹拌機と呼称する）を流れ方向に順次配列し、それらの撹拌機によって形成されるゾーン毎に温度センサー、ＤＯ計を設け、それらのゾーンの処理液の温度、ＤＯ、を連続的に測定し、それらの処理液の温度に対応したＤＯが１．５ｐｐｍを超えないようにするとともに、設定下限値以上になるように、ゾーン毎に独立的に撹拌機の回転数制御をして、活性汚泥処理することを特徴とする安水の活性汚泥処方法とするものである。

【０００９】本発明では、一つのばっき槽に複数の撹拌機を流れ方向に順次配列する。バクテリアの増殖ゾーンと、バクテリアに必要な栄養源を与えて維持する少なくとも二つのゾーンを形成する。更に上記の間に中間ゾーンを形成することが出来る。上記したバクテリアの増殖ゾーンと、バクテリアに必要な栄養源を与えて維持するゾーンでは、酸素の消費量が大きく異なる。

【００１０】本発明では、ゾーンによって酸素の消費量が大きく異なっても、安水を対象とするために、それらのゾーンの処理液がＤＯを１．５ｐｐｍを超えないようにするとともに、設定下限値以上にすることが必要である。

【００１１】ＤＯが１．５ｐｐｍを超えた場合は、本発明が対象とする安水のNH_4^+が多量の溶存酸素で、下記のような化学反応により、分解し有害な硝酸イオンを生成する。

$NH_4^+ + 3/2O_2 = 2H^+ + H_2O + NO^{2-}$

$NO^{2-} + 1/2O_2 = 2NO_3^-$

このような硝酸イオンが生成すると、バクテリアが消滅して、目的を達成することが出来ない。

【００１２】下限は処理液の条件によって、設定値が変わるが、０．５ｐｐｍ程度が実用的に設定される。この設定下限値未満の場合では、溶存酸素が不安定となり、安水の活性汚泥処理が困難である。そのため、本発明で

は撹拌機によって形成されるゾーン毎に独立的にＤＯの調整をするものである。ＤＯの調整は撹拌機の回転数制御によって行うものである。

【００１３】本発明では、図４に示すように、上記撹拌機の回転数が、処理液の温度に対応して、ＤＯと相関関係があることの知見によるものである。即ち、回転数を大きくすると、ＤＯが増加する。この場合、処理液の温度が低い程その傾向にある。

【００１４】上記の関係から、ゾーン毎に処理液の温度に対応して回転数を制御し、ＤＯを１．５ｐｐｍを超えないようにするとともに、下限を設定値以上になるようにして、初めて、活性汚泥処理を円滑に行うことが出来る。本発明では一つのばっき槽の中で、ゾーン毎にＤＯを厳密に調整するので、安水は有害な硝酸イオンに分解しない。

【００１５】

【実施例】以下に本発明の実施例を図によって説明する。図１（ａ）、（ｂ）は本発明の方法に用いるばっき槽の一実施例を示す図であり、（ａ）図は側面断面を示す図で、（ｂ）図は平面を示す図である。

【００１６】ばっき槽１に３つのゾーンＡ、Ｂ、Ｃを設けて、それらのＡ、Ｂ、Ｃゾーンに各々撹拌機２Ａ、２Ｂ、２Ｃを設け、それらの撹拌機２Ａ、２Ｂ、２Ｃの近傍に温度センサー３Ａ、３Ｂ、３Ｃ、ＤＯ計４Ａ、４Ｂ、４Ｃを設けている。ここではその外、化学的酸素要求量（以降ＣＯＤと云う）計５Ａ、５Ｂ、５Ｃ、ｐＨ計６Ａ、６Ｂ、６Ｃ、酸化還元電位（以降ＯＲＰと云う）計７Ａ、７Ｂ、７Ｃを設けている。

【００１７】本発明ではゾーン毎に測定された温度、ＤＯの値が、インタフェス８を介して、各々演算装置９に入力され、記憶装置１０からの必要なデータと比較演算されて、設定範囲を超える危険性を生じた場合は指令装置１１から警告して、撹拌機２Ａ、２Ｂ、２Ｃの回転数を制御して、正常状態に戻す。１２は表示装置である。

【００１８】Ａゾーンでは、必要なバクテリアを増殖させるために、多量の酸素を供給しても、ＤＯが設定範囲に制御されるので、安水中のＮＨ$_4^+$が分解することなく、円滑に活性汚泥処理を行うことが出来る。Ｃゾーンでは、バクテリアを保持するために、必要な栄養量として、酸素を供給する。ここでも、ＤＯが制御されるので、安水中のＮＨ$_4^+$が分解することなく、円滑に活性汚泥処理を行うことが出来る。Ｂゾーンでは、Ａゾーン、Ｃゾーンでの中間的なゾーンとして同様に制御される。

【００１９】上記において、ｐＨは通常６±０．２で管理されているが、ｐＨが６．２を超えた場合は、バクテリアの生存が困難となり、ｐＨが５．８未満の場合は、安水のＮＨ$_4^+$が分解反応を起こす危険性がある。

【００２０】又、ＯＲＰは通常１００～２００ｍＶに管理されている。１００ｍＶ未満ではバクテリアの生存が困難となる。特にＤＯを低値側に調整している場合には、還元電位になり易い。２００ｍＶを超えた場合には、安水のＮＨ$_4^+$が分解反応を起こす危険性がある。そのために、ＤＯ計の外に、ｐＨ計、ＯＲＰ計で、ｐＨ、ＯＲＰが異常値を示した場合には、緊急手段として、回転数を大きく変えて、その正常化を図る。

【００２１】図２は本発明により安水の活性汚泥処理を行う工程の一実施例を示す図である。コークス炉１３からのコークス炉ガスを洗浄して発生した安水は、集気本管１４から、デカンター１５を経て、スチーム処理塔１６でスチーム処理等をして、ＮＨ$_4^+$として、５００～１０００ｐｐｍ程度に調整し、原水タンク１７に一次貯蔵して、そこから上記ばっき槽１に連続的に装入される。ここでは経時に対し、Ａ、Ｂ、Ｃゾーン毎に温度に対応して、撹拌機の回転数制御を行い、ＤＯの設定範囲として、ＤＯを１．５ｐｐｍ以下、設定下限値を０．５ｐｐｍ以上になるように調整する。排水は沈澱池１８、凝固沈澱池１９、砂濾過器２０、活性炭処理器２１を経て、活性汚泥処理工程を終了する。

【００２２】図３は図２の工程でのばっき槽のゾーン毎に処理液の温度、ＤＯを連続的に測定し、独立的に撹拌機の回転数制御をして活性汚泥処理した場合の経時による状態を示す図てある。各ゾーンのＤＯの目標値は１．０ｐｐｍとした。

【００２３】Ａゾーンでは、必要なバクテリアを増殖させるために、多量の酸素を供給するために、撹拌機の回転数を３５ｒｐｍ～３０ｒｐｍに制御し、Ｃゾーンでは、バクテリアを保持するために、必要な栄養量として、酸素を供給するために、撹拌機の回転数を２５ｒｐｍ～２０ｒｐｍに制御し、Ｂゾーンでは、Ａ、Ｃゾーンの中間として、撹拌機の回転数を３０ｒｐｍ～２５ｒｐｍに制御して、各ゾーンのＤＯ値を１．５ｐｐｍ以下、設定下限値を０．５ｐｐｍ以上になるように調整した。上記における処理液の温度は２５～３５℃の範囲で変動した。

【００２４】ばっき槽の各ゾーンが設定範囲に制御されているので、安水による排水は安水中のＮＨ$_4^+$を分解することなく、円滑に活性汚泥処理を行うことが出来た。また、回転数制御にあたって、図５に示すように、汚泥活性度に対応して、ＤＯと相関関係があるので、この活性度もファクターに加えて回転数を決定することができる。図４では、上記撹拌機の回転数が、処理液の活性度に対応して、ＤＯと相関関係があることの知見によるものである。

【００２５】即ち、回転数を大きくすると、ＤＯが増加する。この場合、処理液の活性度が低い程その傾向にある。活性度は汚泥の酸素消費速度から算出される。一定間隔でサンプルをとり、プランクを用いて、単位時間当たりのＤＯを測定して求められる。ここではより精度の高い制御が出来る。

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【００２６】本発明では、又、ゾーン毎に、ＤＯのみでなく、温度、ＣＯＤ、ｐＨ、ＯＲＰの値により、総合的に判断して活性汚泥処理を行うことが出来るので、安水中のNH_4^+が分解することなく、活性汚泥処理を一層円滑に行うことが出来る。以上のように、本発明では、NH_4^+等を含んだ安水という特殊な処理液に対して、それに適した活性汚泥処理を円滑に行うことが出来る。

【００２７】

【発明の効果】本発明によれば、一つのばっき槽の中で、複数のゾーン毎に表面ばっき式撹拌機の回転数制御を独立的に行うので、ＤＯの調整を厳密に出来、安水のNH_4^+を分解することなく、活性汚泥処理を円滑に行うことが出来る。

【図面の簡単な説明】

【図１】本発明に用いる装置の一実施例を示す図である。

【図２】本発明により安水の活性汚泥処理を行う工程の一実施例を示す図である。

【図３】本発明による一実施例の操業状態を示す図である。

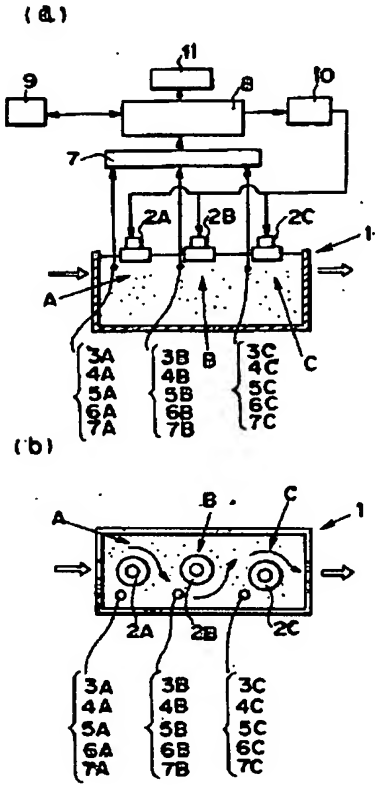
【図４】本発明に用いる表面ばっき式撹拌機の温度に対応した回転数とＤＯ値の関係を示す図である。

【図５】本発明に用いる表面ばっき式撹拌機の活性度に＊対応した回転数とＤＯ値の関係を示す図である。

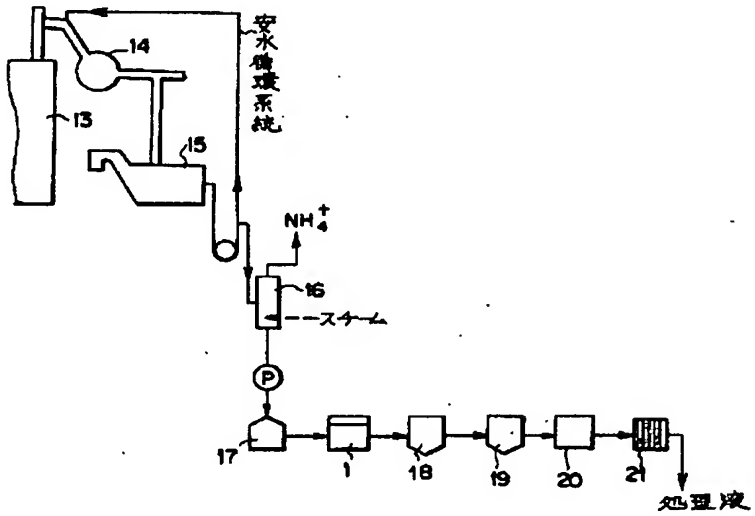
【符号の説明】

１　ばっき槽
２Ａ、２Ｂ、２Ｃ　表面ばっき式撹拌機
３Ａ、３Ｂ、３Ｃ　温度センサー
４Ａ、４Ｂ、４Ｃ　ＤＯ計
５Ａ、５Ｂ、５Ｃ　ＣＯＤ計
６Ａ、６Ｂ、６Ｃ　ｐＨ計
７Ａ、７Ｂ、７Ｃ　ＯＲＰ計
８　インタフェス
９　演算装置
１０　記憶装置
１１　指令装置
１２　表示装置
１３　コークス炉
１４　集気本管
１５　デカンター
１６　スチーム処理塔
１７　原水タンク
１８　沈澱池
１９　凝固沈澱池
２０　砂濾過器
２１　活性炭処理器

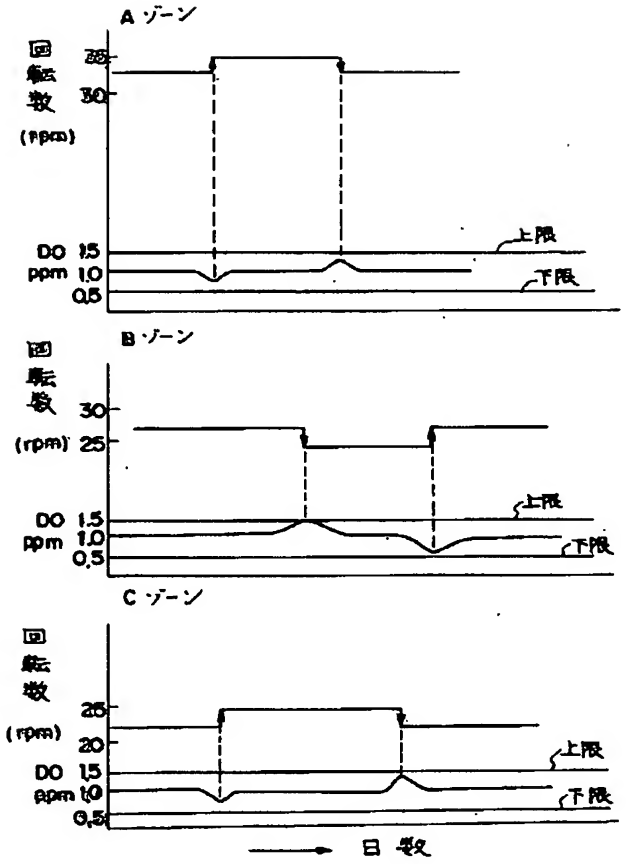
【図１】



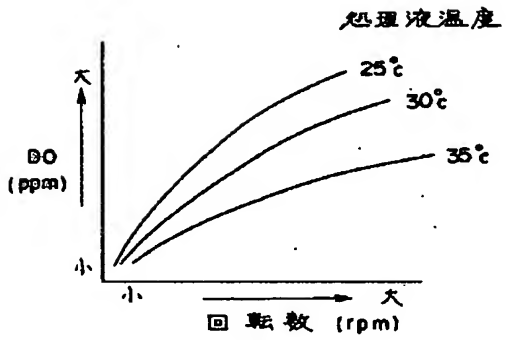
【図２】



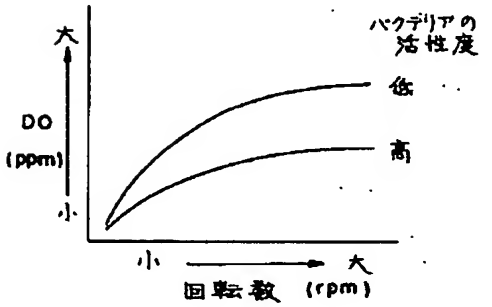
【図３】


A ゾーン
回転数
(rpm)
30
25
DO
ppm
1.5
1.0
0.5
上限
下限
B ゾーン
回転数
(rpm)
30
25
DO
ppm
1.5
1.0
0.5
上限
下限
C ゾーン
回転数
(rpm)
25
20
DO
ppm
1.5
1.0
0.5
上限
下限
日数

【図４】


処理液温度
25℃
30℃
35℃
DO
(ppm)
大
小
小
大
回転数 (rpm)

【図５】


バクテリアの
活性度
低
高
DO
(ppm)
大
小
小
大
回転数 (rpm)

Partial English translation of JP-A-5-212395 (Ref.5)

(page 2, left column, lines 1 to 11)

[Title]

Method for treating active sludge of ammoniacal liquor

[Claims]

1. A method for treating active sludge of ammoniacal liquor generated by a coke oven using an aeration vessel, comprising: sequentially arranging a plurality of surface aeration type agitators in a flow direction in the aeration vessel; installing a temperature sensor and a dissolved oxygen meter in each zone formed by the agitators; continuously measuring the temperature and dissolved oxygen amount of treated liquid in each zone; and independently controlling the rotating speed of the agitator every zones so that the dissolved oxygen amount corresponding to the temperature of the treated liquid is caused not to exceed 1.5 ppm and to be equal to or greater than a set lower limit.

(page 3, left column, line 16 to page 4, right column, line 23)

[0015]
[Embodiment Example]
Hereinafter an embodiment example of the present invention will be described with reference to drawings. Figs. 1A and 1B are views illustrating an embodiment example of the aeration vessel used for the present invention, Fig. 1A is a view illustrating the side cross-section thereof; and Fig. 1B is a view illustrating the plane thereof.

[0016]
Aeration vessel 1 is provided with three zones A, B, and C in which agitators 2A, 2B, 2C are installed, respectively. Close to the agitators 2A, 2B, 2C, temperature sensors 3A, 3B, 3C and DO meters 4A, 4B, 4C are installed, respectively. In addition, here, chemical

oxygen demand (COD) meters 5A, 5B, 5C, pH meters 6A, 6B, 6C, and oxidation-reduction potential (ORP) meters 7A, 7B, 7C are also installed, respectively.

[0017]

In the present invention, the values of temperate and DO measured in each zone are inputted into an operational device 9 through an interface 8 for the operation in comparison with the necessary data from a memory 10. When the values are detected to be dangerous to exceed a set range, a command device 11 indicates a warning sign to control the rotating speed of the agitators 2A, 2B, 2C to return the speeds a normal state. Reference numeral 12 is a display device.

[0018]

In zone A, since, even if a large quantities of oxygen is supplied in order to grow necessary bacteria, DO is controlled within a set range, enabling treatment of active sludge to be performed smoothly without decomposing NH_4^+ in ammoniacal liquor. In zone C, in order to hold bacteria, oxygen is supplied as a necessary nutrition quantity. Here, since DO is also controlled, the treatment of active sludge can be performed smoothly without decomposing NH_4^+ in ammoniacal liquor. In zone B, DO is controlled similarly as an intermediate zone between zone A and zone C.

[0019]

In the above description, although pH is usually controlled to be 6 ± 0.2, when pH exceeds 6.2, it is hard for bacteria to survive, and when pH is lower than 5.8, there is danger in that decomposition reaction of NH_4^+ in ammoniacal liquor occurs.

[0020]

Moreover, ORP is usually controlled to be 100 to 200 mV. When ORP is lower than 100mV, it is hard for bacteria to survive. In particular, when DO is controlled to be lower value side, reduction potential tends to occur. When ORP exceeds 200mV, there is danger in that decomposition reaction of NH_4^+ in ammoniacal liquor occurs. For this

reason, when not only the DO meter but also the pH meter and the ORP meter indicate abnormal values of pH and ORP, respectively, as emergency measures, normalization is tried by changing the rotating speed largely.

[0021]

Fig. 2 is a view illustrating an embodiment example of a process for treating active sludge of ammoniacal liquor according to the present invention. The ammoniacal liquor generated when coke oven gas from a coke oven 13 is cleaned, is passed from a gas collecting main tube 14 through a decanter 15 to a steam treatment tower 16, in which it is subjected to seam treatment etc., and adjusted to have an order of 500 to 1000 ppm NH_4^+, temporarily stored in raw water tank 17, and continuously charged into the aeration vessel 1 from the raw water tank 17. There, the ammoniacal liquor is adjusted every zones A, B, and C for temporal change by controlling the rotating speed of the agitator with being compliant with the temperature of the zones A, B, and C so that the set range of DO becomes equal to or smaller than 1.5 ppm and has an lower limit being equal to or greater than 0.5 ppm. The waste water is passed through a settling basin 18, a coagulating and settling basin 19, a sand filter 20, and an activated carbon treater 21, and then the active sludge treating process is finished.

[0022]

Fig. 3 are views illustrating temporal conditions of each zone when, in the process of Fig. 2, the active sludge treatment is performed by continuously measuring the temperature and the DO of the treated liquid every zones in the aeration vessel, and independently controlling the rotating speed of each agitator. The target value of DO was set to 1.0 ppm.

[0023]

In zone A, by controlling the rotating speed of the agitator to be 35 rpm to 30 rpm in order to supply a large quantities of oxygen required for growth of bacteria, in zone C, by controlling the rotating speed of the agitator to be 25 rpm to 20 rpm in order to supply oxygen as

nutrition required for holding bacteria, and in zone B, by controlling the rotating speed of the agitator to be 30 rpm to 25 rpm as an intermediate zone between the zones A and C, the aeration vessel was adjusted so that DO value of each zone becomes equal to or smaller than 1.5 ppm, and the set lower limit becomes equal to or greater than 0.5 ppm. In the above case, the temperature of the treated liquid fluctuated within a range of 20 to 35 °C.

[0024]

Since each zone of the aeration vessel is controlled to be within the set range, the waste water composed of ammoniacal liquor could be subjected to active sludge treatment smoothly without decomposing NH_4^+ in the ammoniacal liquor. Moreover, when rotating speed is controlled, since as illustrated in Fig. 5, the rotating speed has a correlative relationship with respect to DO with being compliant with the activity of sludge, the rotating speed can be determined by also adding the activity to factors. Fig. 4 is derived from knowledge that the rotating speed of the agitator has a correlative relationship with respect to DO with being compliant with the activity of the treated liquid.

[0025]

In other words, as the rotation number is caused to be larger, DO increases. In this case, the tendency is increased as the activity of the treated liquid decreases. The activity is calculated from the oxygen consumption rate of the sludge, which is obtained by sampling samples at a regular interval and by measuring the DO of the sample per hour using a blank. Here, the control can be performed in higher accuracy.

[0026]

Moreover, in the present invention, since an active sludge treatment can be performed by totally judging every zones not only DO value but also values of temperature, COD, pH, and ORP, the active sludge treatment can be performed more smoothly without decomposing NH_4^+. As mentioned above, in the present invention, a special treating liquid containing NH_4^+ etc. referred to as

ammoniacal liquor, can be smoothly subjected to an active sludge treatment that is suitable to itself.

[0027]

[Effects of the invention]

According to the present invention, since the control of the rotating speed of a surface aeration type agitator is performed independently for each of a plurality of zones in an aeration vessel, control of DO can be performed strictly, enabling treatment of active sludge to be performed smoothly without decomposing NH_4^+.

[Brief Description of Drawings]

Fig. 1 is a view illustrating an embodiment example of an apparatus used for the present invention;

Fig. 2 i s a view illustrating an embodiment example of a process for treating active sludge of ammoniacal liquor according to the present invention;

Fig. 3 is a view illustrating the operating condition of an embodiment example according to the present invention;

Fig. 4 is a view illustrating the relationships between the rotating speed and the DO value, with being compliant with the temperature of an surface aeration type agitator used for the present invention; and

Fig. 5 is a view illustrating the relationshi ps between the rotating speed and the DO value, with being compliant with the activity of the surface aeration agitator used for the present invention.

[Reference Numerals]

1	AERATION VESSEL
2A, 2B, 2C	SURFACE AERATION TYPE AGITATOR
3A, 3B, 3C	TEMPERATURE SENSOR
4A, 4B, 4C	DO METER
5A, 5B, 5C	COD METER
6A, 6B, 6C	PH METER
7A, 7B, 7C	ORP METER
8	INTERFACE
9	OPERATIONAL DEVICE
10	MEMORY
11	COMMAND DEVICE

12	DISPLAY DEVICE
13	COKE OVEN
14	GAS COLLECTING TUBE
15	DECANTER
16	STEAM TREATMENT TOWER
17	RAW WATER TANK
18	SETTLING BASIN
19	COAGULATING AND SETTLING BASIN
20	SAND FILTER
21	ACTIVATED CARBON TREATER

PA-32674
3114 ⑤

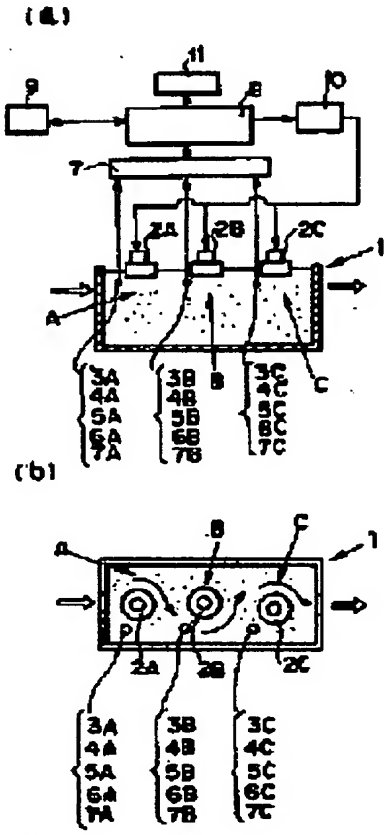
METHOD FOR TREATING ACTIVE SLUDGE OF AMMONIACAL LIQUOR

Publication number: JP5212395
Publication date: 1993-08-24
Inventor: TAWARA TSUTOMU
Applicant: NIPPON KOKAN KK
Classification:
- International: ***C02F3/12; C02F3/14;*** **C02F3/12; C02F3/14;** (IPC1-7): C02F3/12; C02F3/14
- European:
Application number: JP19920016876 19920131
Priority number(s): JP19920016876 19920131

Abstract of **JP5212395**

PURPOSE:To treat smoothly active sludge without decomposing ammonium ions in ammoniacal liquor by arranging more than one agitators of a surface aeration type in the flow direction in an aeration vessel and installing a temperature sensor and a DO meter in each zone formed by these agitators for the continuous measurement.

CONSTITUTION:Agitators 2A, 2B, 2C are installed respectively in A, B, and C zones of an aeration vessels 1, and temperature sensors 3A, 3B, 3C, DO meters 4A, 4B, 4C, COD meters 5A, 5B, 5C, pH meters 6A, 6B, 6C, and oxidation- reduction potential(ORP) meters 7A, 7B, 7C are also installed respectively close to the agitators 2A, 2B, 2C. The values of temperate and DO measured in each zone are inputted into an operational device 9 through an interface 8 for the operation in comparison with the necessary data from a memory 10. When the values are detected to be dangerous to exceed a set range, a command device 11 indicates a warning sign to control the rotating speed of the agitators 2A, 2B, 2C to return the speeds a normal state. In this way, the DO values of A, B, and C zones of one aeration vessel can be controlled within the set range.



* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] In the approach of carrying out activated sludge treatment of the ammoniacal liquor generated from coke oven using an aeration basin The sequential array of two or more surface ****** type agitators is carried out in a flow direction at said aeration basin. A thermo sensor and a dissolved oxygen analyzer are established for every zone formed by those agitators. While measuring continuously the temperature of the processing liquid of those zones, and the amount of dissolved oxygen and making it the amount of dissolved oxygen corresponding to the temperature of those processing liquid not exceed 1.5 ppm The active sludge writing-a prescription method of the ammoniacal liquor characterized by carrying out and carrying out activated sludge treatment of the revolving speed control of an agitator in independent for every zone so that it may become more than a setting lower limit.

[Translation done.]

* NOTICES *

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the activated-sludge-treatment approach of the ammoniacal liquor generated from coke oven.
[0002]
[Description of the Prior Art] Various components and an impurity are contained in the ammoniacal liquor generated from coke oven. Since an impurity is included, the ammoniacal liquor which separation recovery of the various components in ammoniacal liquor was carried out with predetermined equipment, and separated these has been processed and discharged by activated carbon, after carrying out coagulation sedimentation processing, activated sludge treatment and.
[0003] although the above-mentioned activated sludge treatment is what removes biochemical oxygen demand (BOD) by bacteria -- the inside of ammoniacal liquor -- NH4+CN- etc. -- there is harmful matter to bacteria and processability is influenced by the concentration of these harmful matter. Therefore, the processability of bacteria is seen, and when processability is bad, dilution etc. is adjusting the concentration of harmful matter.
[0004] However, since the criteria of dilution are not clear, activated sludge treatment tends to become unstable. As one of the cure of the, alkali treatment of the ammoniacal liquor is carried out to JP,58-61892,A, and they are all NH4+. While being referred to as 500 ppm or less, after carrying out [above-mentioned] processing and setting free ammonia concentration to 150 ppm or less, it is the activated-sludge-treatment approach of the ammoniacal liquor processed with active sludge. There is a method of performing ****** mechanically as processing of active sludge. Stirring equipment is required in order to make the required oxygen for breeding a microorganism here supply.
[0005] In the mechanical aeration basin discharged towards the outflow side from the inflow side of non-processing raw water as an approach of processing organic wastewater of common domestic wasted water etc. in JP,59-162996,A While detecting the amount of dissolved oxygen of one 2nd after an inflow side of aeration basins (it is henceforth called DO) As said detection value is [beforehand / the detection value] in agreement with desired value based on the comparison result in a ** useless ****** dissolved oxygen value, they are said detected aeration basin and the approach of controlling the rotational frequency of each impeller of the aeration basin by the side of an inflow from it.
[0006]
[Problem(s) to be Solved by the Invention] however, NH4+ like ammoniacal liquor etc. -- the processing liquid containing harmful matter -- fluctuation of the oxygen in an aeration basin -- NH4+ Irrespective of quantity, they decompose and it has harmful effect. therefore -- an approach in performing ****** of ammoniacal liquor mechanically, as shown in JP,59-162996,A -- NH4+ etc. -- when decomposition may be produced and disassembly of such harmful matter is produced, bacteria cannot decrease in number conversely and smooth processing of active sludge cannot be performed.
[0007] In this case, since the ammoniacal liquor drained continuously cannot be processed

smoothly, the problem of causing trouble is in operation of the waste-water-treatment process of works. So, it aims at offering the activated-sludge-treatment approach suitable for special processing liquid called ammoniacal liquor in this invention.

[0008]

[Means for Solving the Problem and its Function] In the approach this invention carries out activated sludge treatment of the ammoniacal liquor generated from coke oven using an aeration basin in order to attain the above-mentioned purpose The sequential array of two or more surface ****** type agitators (an agitator is called henceforth) is carried out in a flow direction at said aeration basin. While establishing a thermo sensor and DO meter for every zone formed by those agitators, measuring the temperature of the processing liquid of those zones, and DO continuously and making it DO corresponding to the temperature of those processing liquid not exceed 1.5 ppm It considers as the active sludge writing-a prescription method of the ammoniacal liquor characterized by carrying out and carrying out activated sludge treatment of the revolving speed control of an agitator in independent for every zone so that it may become more than a setting lower limit.

[0009] In this invention, the sequential array of two or more agitators is carried out in a flow direction at one aeration basin. The growth zone of bacteria and at least two zones which give and maintain a nutrient required for bacteria are formed. Furthermore, a middle zone can be formed between the above. The growth zone of the above-mentioned bacteria differs in the consumption of oxygen greatly from the zone which gives and maintains a nutrient required for bacteria.

[0010] In this invention, since it is aimed at ammoniacal liquor even if the consumption of oxygen changes greatly with zones, it is required to carry out DO more than a setting lower limit, while making it the processing liquid of those zones not exceed 1.5 ppm.

[0011] It is NH4+ of target ammoniacal liquor [this invention] when DO exceeds 1.5 ppm. It is a lot of dissolved oxygen, and by the following chemical reactions, it decomposes and harmful nitrate ion is generated.

NH4++3/2O2 =2H++H2 O+NO2-NO2- +1/2O2 =2NO3 - If such nitrate ion generates, bacteria cannot disappear and the purpose cannot be attained.

[0012] Although a minimum changes the set point according to the conditions of processing liquid, about 0.5 ppm is set up practical. In the case of under this setting lower limit, dissolved oxygen becomes unstable, and the activated sludge treatment of ammoniacal liquor is difficult. Therefore, in this invention, DO is adjusted in independent for every zone formed by the agitator. The revolving speed control of an agitator performs adjustment of DO.

[0013] In this invention, as shown in drawing 4 , the rotational frequency of the above-mentioned agitator is based on the knowledge of there being DO and a correlation corresponding to the temperature of processing liquid. That is, if a rotational frequency is enlarged, DO will increase. In this case, it is in that inclination, so that the temperature of processing liquid is low.

[0014] While controlling a rotational frequency for every zone corresponding to the temperature of processing liquid and making it not exceed 1.5 ppm for DO from the above-mentioned relation, activated sludge treatment can be smoothly performed only after, as it becomes about a minimum beyond the set point. In this invention, in one aeration basin, since DO is strictly adjusted for every zone, ammoniacal liquor is not decomposed into harmful nitrate ion.

[0015]

[Example] Drawing explains the example of this invention below. Drawing 1 (a) and (b) are drawings showing one example of the aeration basin used for the approach of this invention, the (a) Fig. is drawing showing a side-face cross section, and the (b) Fig. is drawing showing a flat surface.

[0016] Three zones A, B, and C were established in the aeration basin 1, agitator 2A, 2B, and 2C were respectively prepared in those A and B, and C zone, and thermo sensors 3A, 3B, and 3C, DO total 4A, and 4B and 4C are prepared near those agitator 2A, 2B, and 2C. Here, chemical-oxygen-demand (it is henceforth called COD) total 5A, 5B and 5C, pH meters 6A,

6B, and 6C, oxidation-reduction-potential (it is henceforth called ORP) total 7A, and 7B and 7C are prepared outside it.

[0017] In this invention, through INTAFESU 8, the value of the temperature measured for every zone and DO is respectively inputted into an arithmetic unit 9, and a comparison operation is carried out to the required data from a store 10, and when the danger of exceeding a setting range is produced, it warns from a director 11, and the rotational frequency of agitator 2A, 2B, and 2C is controlled, and it returns to an all seems well. 12 is a display.

[0018] Since DO is controlled by A zone by the setting range even if it supplies a lot of oxygen, in order to proliferate required bacteria, it is NH4+ in ammoniacal liquor. Activated sludge treatment can be performed smoothly, without decomposing. In C zone, in order to hold bacteria, oxygen is supplied as a required amount of nutritions. Here, since DO is controlled, it is NH4+ in ammoniacal liquor. Activated sludge treatment can be performed smoothly, without decomposing. It is similarly controlled by B zone as an in-between zone in A zone and C zone.

[0019] Although pH is usually managed by 6**0.2 in the above, when survival of bacteria becomes difficult when pH exceeds 6.2 and pH is less than 5.8, it is NH4+ of ammoniacal liquor. There is a danger of causing a decomposition reaction.

[0020] ** and ORP are usually managed by 100-200mV. In less than 100mV, survival of bacteria becomes difficult. When especially DO is being adjusted to the low value side, it is easy to become reduction potential. When it exceeds 200mV, it is NH4+ of ammoniacal liquor. There is a danger of causing a decomposition reaction. Therefore, besides DO meter, with a pH meter and an ORP plan, when pH and ORP show outlying observation, as emergency measures, a rotational frequency is changed a lot and the normalization is attained.

[0021] Drawing 2 is drawing showing one example of the process which performs activated sludge treatment of ammoniacal liquor by this invention. the ammoniacal liquor which washed the coke oven gas from coke oven 13, and was generated should pass a decanter 15 from the **** main 14 -- steam processing -- a column 16 -- steam processing etc. -- carrying out -- NH4+ ****** -- it adjusts to about 500-1000 ppm, and it stores in a raw water tank 17 primarily, and is continuously inserted in the above-mentioned aeration basin 1 from there. Here, it passes, and to the time, corresponding to temperature, revolving speed control of an agitator is performed for every A, B, and C zone, and as a setting range of DO, it adjusts so that DO may be set to 1.5 ppm or less and a setting lower limit may be set to 0.5 ppm or more. Wastewater ends an activated-sludge-treatment process through a settling basin 18, the coagulation settling basin 19, a sandfilter 20, and the activated-carbon-treatment machine 21.

[0022] Drawing 3 is ******** which shows the condition by the passage of time at the time of measuring the temperature of processing liquid, and DO continuously for every zone of the aeration basin in the process of drawing 2 , and carrying out and carrying out activated sludge treatment of the revolving speed control of an agitator in independent. Desired value of DO of each zone was set to 1.0 ppm.

[0023] In order to supply a lot of [in order to proliferate required bacteria] oxygen, the rotational frequency of an agitator is controlled by A zone to 35rpm - 30rpm. In C zone As an amount of nutritions required in order to hold bacteria, in order to supply oxygen, the rotational frequency of an agitator is controlled to 25rpm - 20rpm. In B zone As middle of A and C zone, the rotational frequency of an agitator was controlled to 30rpm - 25rpm, and it adjusted so that DO value of each zone might be set to 1.5 ppm or less and a setting lower limit might be set to 0.5 ppm or more. The temperature of the processing liquid in the above was changed in 25-35 degrees C.

[0024] The wastewater by ammoniacal liquor since each zone of an aeration basin is controlled by the setting range is NH4+ in ammoniacal liquor. Activated sludge treatment was able to be performed smoothly, without decomposing. Moreover, since there are DO and a correlation in revolving speed control corresponding to sludge activity as shown in drawing 5 , in addition to a factor, this activity can also determine a rotational frequency. In drawing

4 , the rotational frequency of the above-mentioned agitator is based on the knowledge of there being DO and a correlation corresponding to the activity of processing liquid.
[0025] That is, if a rotational frequency is enlarged, DO will increase. In this case, it is in that inclination, so that the activity of processing liquid is low. Activity is computed from the oxygen consumption coefficient of sludge. A sample is taken at fixed spacing, and using a plank, DO per unit time amount is measured and it asks. Here, high control of precision can be performed more.
[0026] Since it can judge synthetically and activated sludge treatment can be performed with the value of not only DO but temperature, and COD, pH and ORP for every ** and zone in this invention, it is NH4+ in ammoniacal liquor. Activated sludge treatment can be performed still more smoothly, without decomposing. as mentioned above -- this invention -- NH4+ etc. -- activated sludge treatment suitable for it can be smoothly performed to special processing liquid called the included ammoniacal liquor.
[0027]
[Effect of the Invention] Activated sludge treatment can be performed smoothly, without according to this invention, being able to make adjustment of DO strict and decomposing NH4+ of ammoniacal liquor in one aeration basin, since revolving speed control of a surface ****** type agitator is performed in independent for two or more zones of every.

[Translation done.]

* NOTICES *

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2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is drawing showing one example of the equipment used for this invention.
[Drawing 2] It is drawing showing one example of the process which performs activated sludge treatment of ammoniacal liquor by this invention.
[Drawing 3] It is drawing showing the operation condition of one example by this invention.
[Drawing 4] It is drawing showing the relation between the rotational frequency corresponding to the temperature of the surface ****** type agitator used for this invention, and DO value.
[Drawing 5] It is drawing showing the relation between the rotational frequency corresponding to the activity of the surface ****** type agitator used for this invention, and DO value.
[Description of Notations]
1 Aeration Basin
2A, 2B, 2C Surface ****** type agitator
3A, 3B, 3C Thermo sensor
4A, 4B, 4C DO meter
5A, 5B, 5C COD meter
6A, 6B, 6C PH meter
7A, 7B, 7C ORP meter
8 INTAFESU
9 Arithmetic Unit
10 Storage
11 Director
12 Display
13 Coke Oven
14 **** Main
15 Decanter
16 Steam Processing -- Column
17 Raw Water Tank
18 Settling Basin
19 Coagulation Settling Basin
20 Sandfilter
21 Activated-Carbon-Treatment Machine

[Translation done.]

Fig. 1

~~[図1]~~

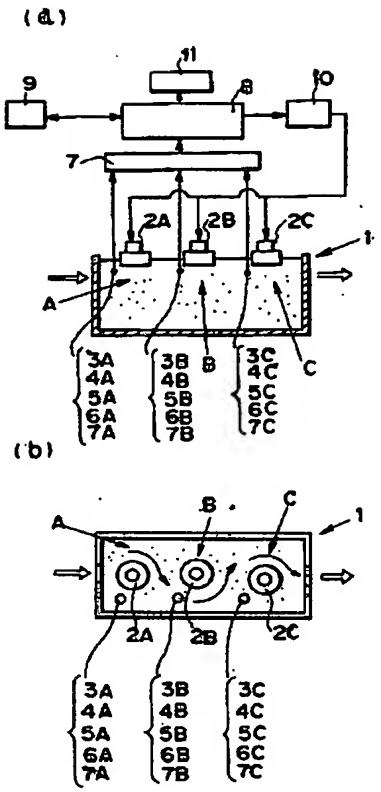


Fig. 2

~~[図2]~~

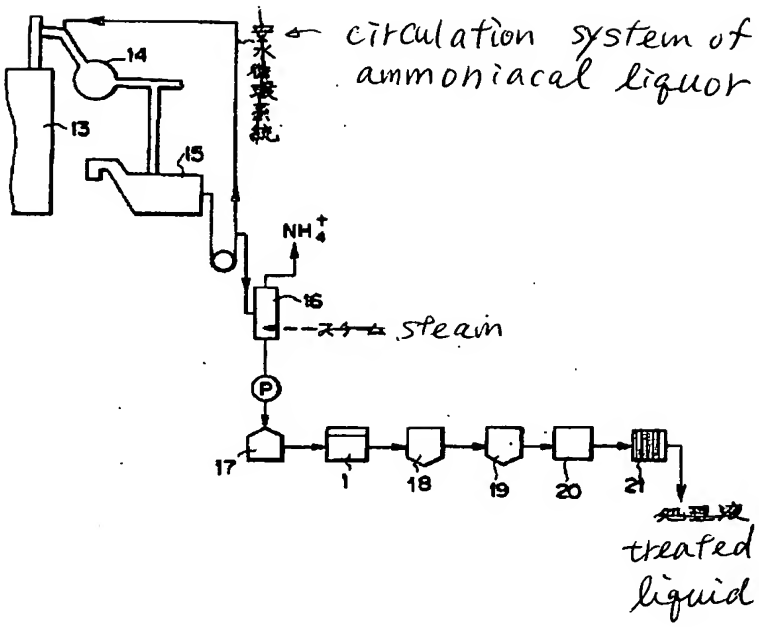


Fig. 3

【図3】

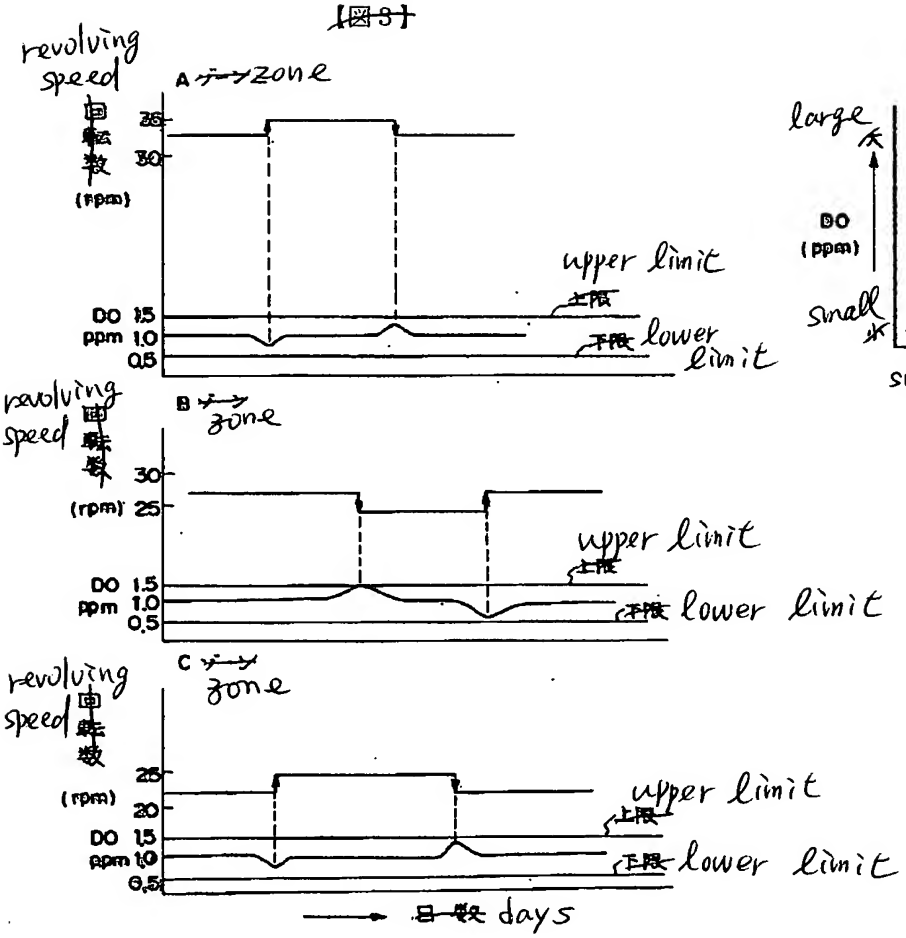
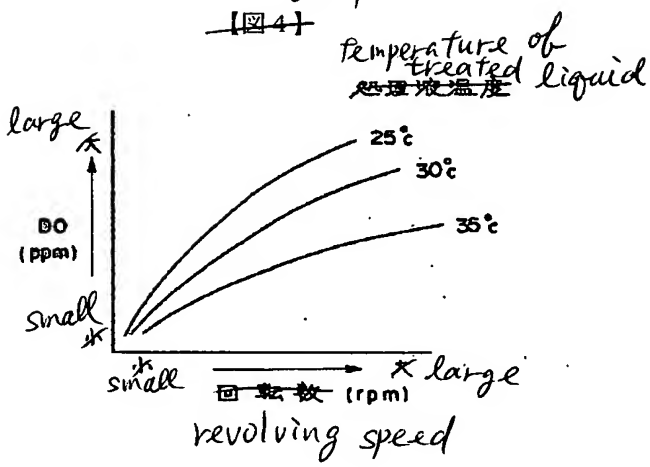


Fig. 4

【図4】



【図5】 Fig. 5